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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/080,813	02/22/2002	Kenny T. Coker	P1608US01	9893

7590 07/23/2004

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EXAMINER

BRAGDON, REGINALD GLENWOOD

ART UNIT	PAPER NUMBER
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2188

DATE MAILED: 07/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/080,813	Applicant(s) COKER ET AL.	
	Examiner Reginald G. Bragdon	Art Unit 2188	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 May 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Drawings

1. The drawings are objected to because:

With respect to the figures filed 14 May 2002:

In figure 5, "Step 268" has no close parenthesis ("").

In figure 8, element 236 has no right vertical bar (see figures 7 and 9).

2. Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-6 and 9-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Zangenehpour (5,146,578).

As per claims 1, 9, and 13, Zangenehpour teaches prefetching data from a mass storage device (“data recording medium”) into a cache memory (“buffer”) based on a past history of requests. The mass storage device 15-18 may be a magnetic disk (see column 3, lines 51-52), where the data is stored on the disks in sectors (see column 5, line 24), where each sector has a sector address (see column 6, lines 48-50). A magnetic disk drive inherently includes a movable data transducing head. With reference to figure 1, the mass storage controller 13 (“interface circuit” or “means for dynamically switching” or step of “switching”) receives fetch (“read”) requests from the CPU 12, where if a plurality of requests are sequential (“...proximity of a data sector address of a most recently received read command to data sector addresses associated with previously received read commands”) the system switches from a non-prefetch condition (“nonlocal mode”) to a prefetch condition (“local mode”). See figure 2, steps 34, 38, and 42. During prefetch 2, 4, or 8 blocks of data are prefetched (“nonrequested user data from the recording medium”) and placed in the cache. If the last few requests are not sequential, then no prefetching occurs (“nonrequested user data are not retrieved”). See Step 33 of figure 2.

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As per claims 2, 10-11, and 14, Zangenehpour teaches a register 50 in cache control logic 21 which contains the highest logical sector address of the most recent fetch request, which is compared to the current fetch request to determine if the addresses are sequential. The register represents a range of recently accessed sectors addresses using the count field (since each increment value greater than zero in the count field indicates a plurality of prefetched blocks, where each block is comprised of a plurality of sectors which is a range of a sector addresses), which indicates the number of addresses that have been accessed sequentially. See column 6, lines 42-64.

As per claims 3 and 15, when the next address is sequential with a previous address, then a prefetch is initiated.

As per claims 4 and 16, Zangenehpour teaches not prefetching (switching from prefetching to not prefetching) if the requests are not sequential. See figure 2, steps 33, 37, and 41.

As per claims 5 and 17, Zangenehpour teaches a register 50 in cache control logic 21 which contains the highest logical sector address of the most recent fetch request, which is compared to the current fetch request to determine if the addresses are sequential. The register represents a range of recently accessed sectors addresses using the count field (since each increment value greater than zero in the count field indicates a plurality of prefetched blocks, where each block is comprised of a plurality of sectors which is a range of a sector addresses), which indicates the number of addresses that have been accessed sequentially. See column 6, lines 42-64. When the current request is not sequential with the highest logical sector address of the most recent fetch request, then no prefetching is performed.

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As per claims 6 and 18, Zangenehpour teaches that the mass storage devices 15-18 are typically magnetic disk drives. See column 3, lines 51-52, and column 5, line 23.

As per claim 12, Zangenehpour teaches pseudocode to implement the prefetch algorithm by the mass storage controller 13, and therefore the controller is programmable to implement the prefetch algorithm.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zangenehpour in view of Applicant's admitted prior art.

As per claims 7-8, Zangenehpour does not specifically teach implementing a read look-ahead (RLA) or read-on-arrival (ROA) prefetch technique. Applicant's admitted prior art teaches that RLA and ROA are well known approaches for placing prefetched data into a buffer. See page 3, lines 1-7. It would have been obvious to one of ordinary skill in the art to have utilized RLA or ROA for placing prefetched data in the cache, in particular during sequential accesses (page 3, lines 9-11), as suggested by the admitted prior art, because this would improve cache hit rates.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Fox et al. (6,654,850) teaches improving caching by using RLA and ROA techniques.

Gaertner et al. (6,339,811) teaches RLA and zero latency prefetching (equivalent to ROA).

Takaichi (US 2003/0018849) teaches disk pre-reading using a read command record table.

Vishlitzky et al. (5,682,500) teaches prefetching upon determination of sequential accessing in a disk system.

8. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks
Washington, D.C. 20231

All "OFFICIAL" patent application related correspondence transmitted by FAX must be directed to the central FAX number at **(703) 872-9306**:

"INFORMAL" or "DRAFT" FAX communications may be sent to the Examiner at **(703) 746-5693**, only after approval by the Examiner.

Hand-delivered responses should be brought to Crystal Park II, 2121
Crystal Drive, Arlington, VA., Fourth Floor (receptionist).

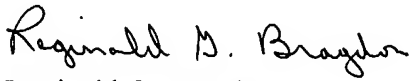
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9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Reginald G. Bragdon whose telephone number is (703) 305-3823. The examiner can normally be reached on Monday-Thursday from 7:00 AM to 4:30 PM and every other Friday from 7:00 AM to 3:30 PM.

The examiner's supervisor, Mano Padmanabhan, can be reached at (703) 306-2903.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-3900.

RGB
July 20, 2004


Reginald G. Bragdon
Primary Patent Examiner
Art Unit 2188